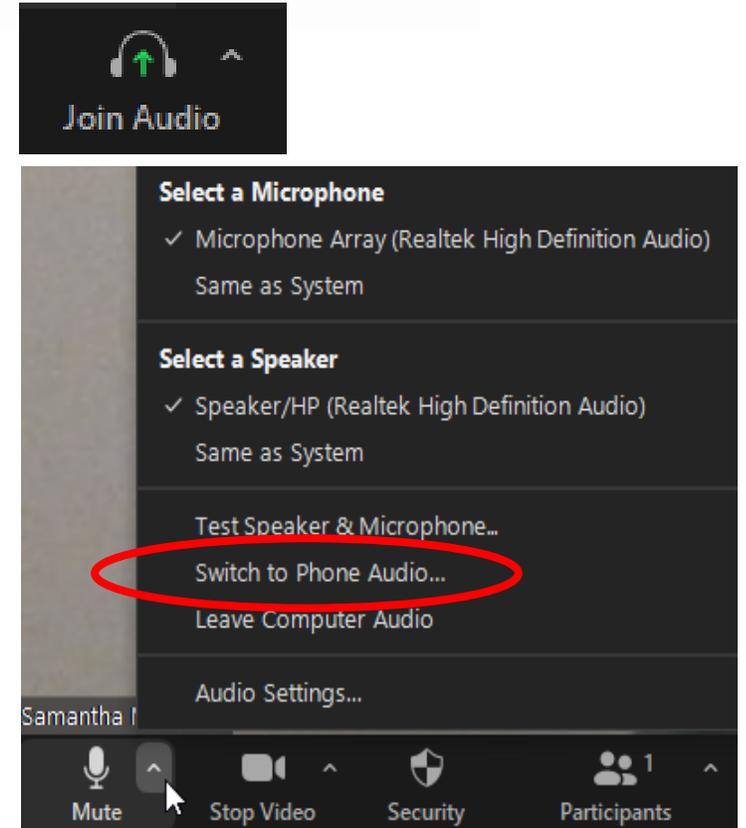


**Columbia Basin Collaborative
Hatchery & Harvest Work Group
November Meeting**

November 1, 2022

Zoom Features

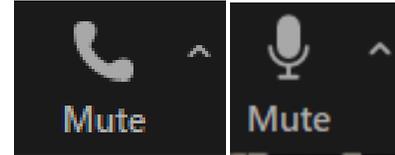
- If you have not **connected your audio**, click on the “Join Audio” at the bottom left of your screen.
- To **switch to phone**, click the arrow next to the microphone icon and select “Switch to Phone Audio”.
- If you have joined by browser, please click “Audio Settings”



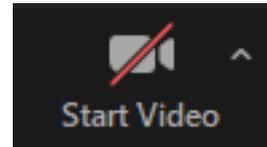
For technical support, please contact Grant Simmons, 831-331-7077

Zoom Features

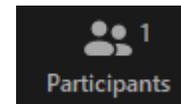
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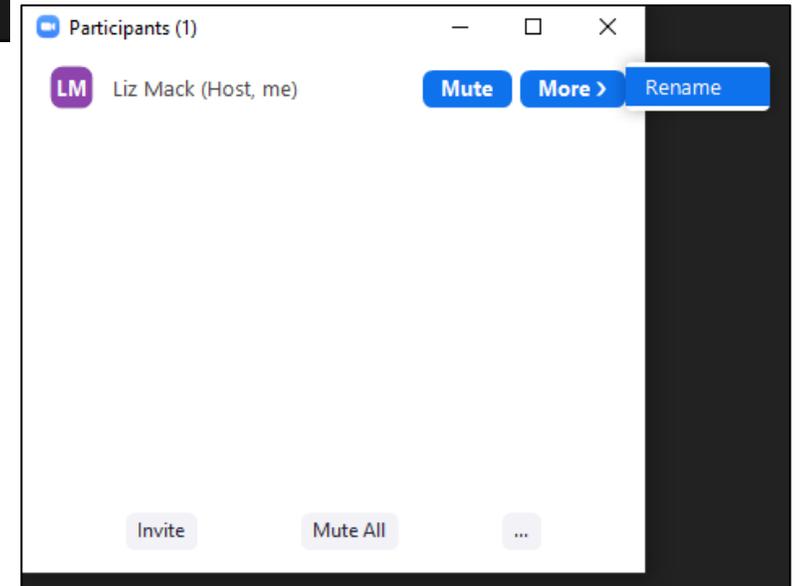
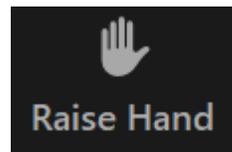
Use video, if possible, to promote face to face communication.



If needed rename yourself in the participant panel.



Find your raise hand function at the bottom of your screen



Welcome, Agenda Review, and Updates

Meeting Guidelines

- Honor the agenda
- Listen to understand and ask questions to clarify
- Balance speaking time
- Don't pile on
- Be hard on the problems, soft on the people
- Seek alignment and common ground wherever possible
- Be present



Agenda Review

Time (PT)	Topic
1:00 – 1:15 pm	Welcome, Agenda Review, and Updates
1:15 – 1:25 pm	Feedback from I/RG
1:25 – 2:10 pm	Harvest Impacts and Connections
2:10 – 2:20 pm	Break
2:20 – 3:00 pm	Hatchery Management
3:00 – 3:45 pm	Gaps and Needs
3:45 – 3:55 pm	Between Meeting Work
3:55 – 4:00 pm	Confirm Next Steps and Action Items

Feedback from I/RC

Hatchery/Harvest Work Plan

Meeting	Key Topics/Outcomes
<i>Kick off</i>	<ul style="list-style-type: none">• <i>Come to shared understanding of the assignment from the I/RG and information available from the CBPTF</i>• <i>Assess existing forums, gaps, and funding needs and sources</i>• <i>Agree on next steps</i>
Meeting 2	<ul style="list-style-type: none">• Review relevant data and further discuss the impacts of fisheries and the hatchery/harvest interrelationship.• Identify levels of harvest that the medium and high level goals would support.• Identify most critical information and implementation gaps and needs and opportunities. Then, crosswalk these with recommendations from other efforts to develop early recommendations.• Look stock by stock for any additional needs considering work from other groups such as HSRG recommendations and recovery plans.
Meeting 3	<ul style="list-style-type: none">• Share proposed recommendations for actions/programs considering the discussion from meeting #2 and the following:<ul style="list-style-type: none">○ Equitable distribution of harvest○ Finer-scale impacts○ Mitigation and treaty obligations
Meeting 4	<ul style="list-style-type: none">• Finalize recommendations to go to the Science Integration Work Group and the IRG.

Recommended Action Form

1. Work Group developing the action:
2. Summary of action:
 - a. Is this part of an existing program or new program?
3. Benefit: (link to matrices)
 - a. What benefit will the action provide?
 - b. What data support this?
4. Entities that would implement that action:
5. Timing:
 - a. How long will it take to implement that action?
 - b. How long until fish populations benefit from action?
6. Stock(s) benefited by the action and magnitude of benefit for each stock(s)
7. Estimated cost:
8. Uncertainties related to the action:
9. Regulatory processes or policies associated with the action:
10. Potential challenges:
11. Adaptive management (describe how this will be incorporated into to action):

Harvest Impacts and Connections

Fishery Impacts- Phase 2 Report, Appendix C, Page 49

Table 11. Stock specific fishery mortality rates (%) by major fishery areas.

Stock	Stock abbreviation	Ocean			Columbia River			Upriver Tribes	Total
		SE AK	Canada	WA/OR	Sport	Comm	Treaty		
Spring Chinook L Col	CHS LCR	4.1	2.5	2.2	7.8	0.5	0.0	0.0	17.1
Spring Chinook Willamette	CHS UWR	4.1	2.5	2.2	3.7	0.4	0.0	0.0	12.9
Spring Chinook Mid Col	CHS MCR	0.0	0.0	0.0	4.7	0.5	9.4	0.0	14.6
Spring Chinook U Col	CHS UCR	0.0	0.0	0.0	1.2	0.5	10.1	3.0	14.8
Spring Chinook Snake	CHS SR	0.0	0.0	0.0	2.5	0.5	11.4	0.0	14.4
Summer Chinook U Col	CHSu UCR	13.3	15.6	6.7	6.3	2.7	13.9	2.7	61.2
Fall Chinook U Col	CHF UCR	20.8	12.3	2.5	7.5	3.7	14.5	0.0	61.3
Fall Chinook Deschutes	CHF MCR	20.8	12.3	2.5	6.3	3.7	9.2	0.0	54.8
Fall Chinook Snake	CHF SR	2.2	7.5	9.8	5.4	3.7	16.0	0.0	44.6
Fall (tule) Chinook L Col	CHF LCR	3.2	5.5	11.8	7.6	4.5	0.0	0.0	32.6
Fall (brite) Chinook L Col	CHFI LCR	10.2	16.1	7.8	8.5	4.7	0.0	0.0	47.3
Chum L Col	CHU LCR	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.6
Coho L Col	COH LCR	0.0	1.7	10.2	1.0	4.1	0.0	0.0	17.0
Coho abv Bonn Dam	COH UpR	0.0	1.7	10.2	1.0	4.1	5.0	0.0	22.0
Sockeye Deschutes	SES MCR	0.0	0.0	0.0	0.0	0.4	2.9	0.0	3.3
Sockeye U Col	SES UCR	0.0	0.0	0.0	0.0	0.5	5.7	5.5	11.7
Sockeye Snake	SES SR	0.0	0.0	0.0	0.0	0.1	5.5	0.0	5.6
Summer Steelhead L Col	STS LCR	0.0	0.0	0.0	5.0	0.1	0.0	0.0	5.1
Summer Steelhead Mid Col	STS MCR	0.0	0.0	0.0	2.2	1.0	6.3	0.0	9.5
Summer Steelhead U Col	STS UCR	0.0	0.0	0.0	0.8	1.0	6.5	1.8	10.1
Summer Steelhead Snake	STS SR	0.0	0.0	0.0	16.0	1.0	8.0	0.0	25.0
Win Steelhead SW WA	STW SWW	0.0	0.0	0.0	5.0	0.2	0.0	0.0	5.2
Win Steelhead L Col	STW LCR	0.0	0.0	0.0	5.0	0.2	0.0	0.0	5.2
Win Steelhead U Willamette	STW UWR	0.0	0.0	0.0	2.0	0.7	0.0	0.0	2.7

Key Salmon Harvest Management Forums

- *U.S. v Oregon*
- Pacific Fishery Management Council (PFMC)
- North of Falcon
- Pacific Salmon Treaty/Commission
- Columbia River Compact

U.S. v. OREGON

- 1968 Federal court ruled equitable harvest for Columbia River Tribes.
- Columbia River Fish Management Plan adopted (CRFMP) as court order in 1988.
- Current CRFMP 2018-2027
- Plan aimed at rebuilding weak salmon and steelhead runs.
 - Rebuild upriver runs and fairly share harvest
 - Provide for spawning escapement first
 - Protect weak stocks

Pacific Fishery Management Council (PFMC)

- Magnuson Fishery Conservation and Management Act of 1976 established PFMC
- Manages the conservation and ocean harvest of fish from the U.S.-Canada border south to Mexico
- Fourteen voting members
- Columbia River stocks key contributor to ocean fisheries
 - Fall Chinook
 - Summer Chinook
 - Coho

Pacific Fishery Management Council (PFMC)

- PFMC technical committees collaborate to reach consensus on scientific data
- PFMC technical committees coordinate with other committees
 - TAC and Chinook Technical Committee (CTC)
- PFMC recommended ocean seasons are promulgated by the Secretary of Commerce
- States adopt ocean regulations in state waters

North of Falcon (NOF)

Ocean/In-river coordination

- Planning of freshwater fisheries concurrent with ocean season setting
- Provides assurance that Columbia River fisheries are reconciled with ocean fisheries
- Escapement goals, ESA requirements, and harvest sharing objectives achieved
- Includes public involvement

Pacific Salmon Commission

- 1985 salmon treaty between the U.S. and Canada for management of Pacific salmon
- Four commissioners and four alternates from each country
- There are four panels (Northern, Southern, Fraser and TBR)

Pacific Salmon Commission

- Several Technical Committees
- Harvest levels controlled by AABM* and ISBM* management
- Appropriates finances for treaty implementation

*AABM = an Aggregate Abundance-Based Management regime; catch levels are set by the expected abundance (index) summed over all stocks present in a fishery

*ISBM = an Individual Stock-Based Management regime; fisheries are shaped w/ consideration of objectives for particular stocks (all So. US, most So. BC fisheries)

Columbia River Compact

- Compact and agreement between Oregon and Washington ratified by Congress 1918
- Laws adopted by mutual consent
- Fishery decision-making authority
 - Provides concurrent jurisdiction of Columbia fisheries
 - Compact comprised of Directors or designees of WDFW and ODFW
 - Public hearings held to adopt or modify seasons and regulations
 - Regulations reflect harvest sharing and conservation requirements of US v Oregon, ESA, and state policies

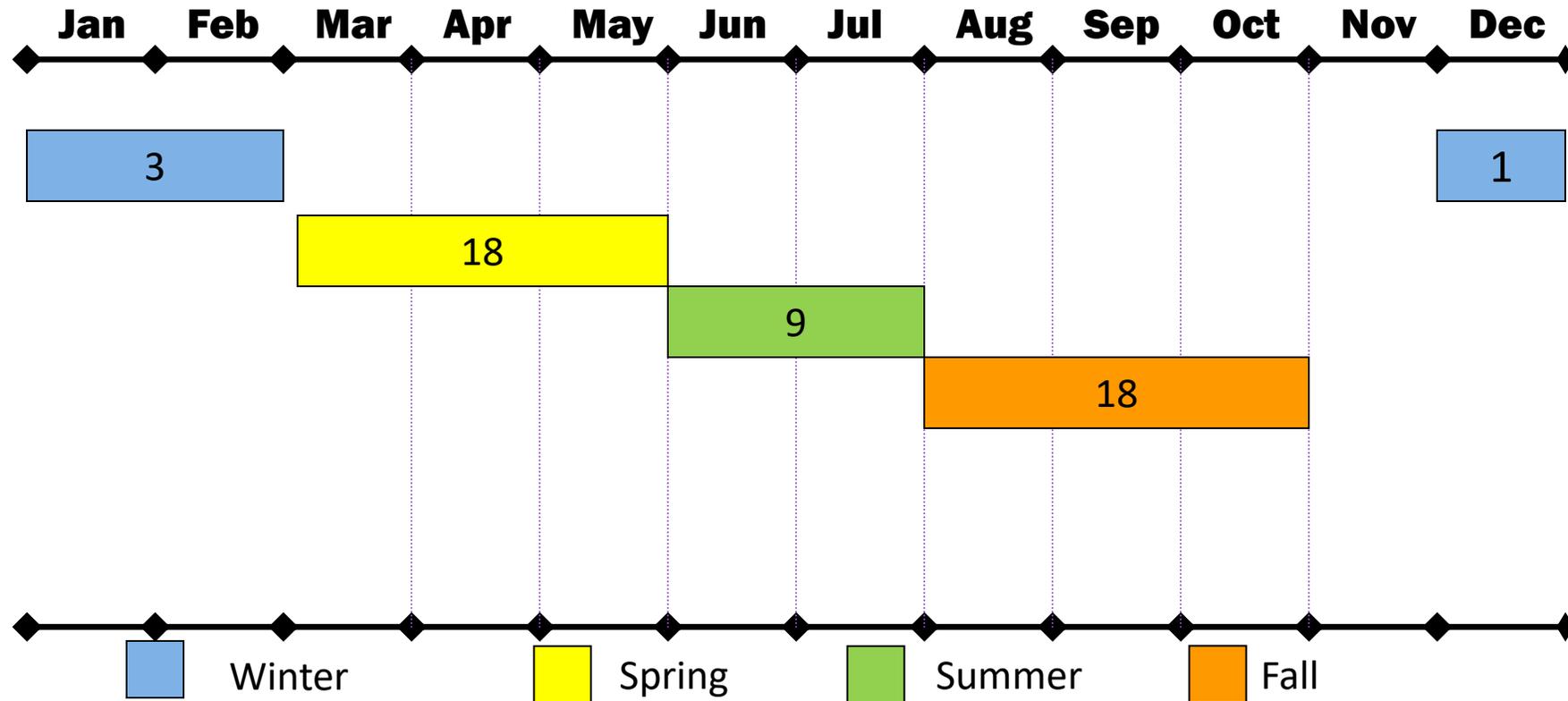
Management Cycle

- Preseason forecasts with TAC
- Meet with Advisor Groups to develop seasons
 - Columbia River Recreational and Commercial
- Compact/Joint State hearing
 - Public provides comments on recommendations
- Monitor fisheries and runs in-season (TAC)
 - Catch estimates, CWTs, dam counts
- Modify fisheries as needed

Forecast Updates and In-Season Management

- Expected run to Bonneville updated first
- Catches in lower river fisheries added to get river mouth run size
 - Actual catches plus any additional expected catches derived from harvest models
- Run sizes normally updated weekly – sometimes twice a week
- Fisheries catch by stock in-season based on CWT analysis

Average Compact/Joint State Hearings



Tools For Managing Fisheries

- Catch quotas
- Selective fisheries
 - Mark-selective (MSF) – release fish with fins intact
 - Time, area, gear selective
 - Season structure (time/area)
 - Gear type (e.g., net mesh size)
- On-board monitoring

Catch Quotas

- Fisheries managed for catch guidelines/quotas
- May be stock-specific within total catch
- Sport fisheries estimated by catch and effort counts
- Commercial estimated by landings
- Tribal estimated by both

Phase 2 Report, pg. 53

TABLE 10. Current (recent 10-year average) harvest of Columbia Basin salmon and steelhead in freshwater (Col basin) and ocean fisheries and potential harvest at high natural production goals and anticipated hatchery production levels. (See Table 9 for more detail on anticipated hatchery production levels).

Stock	Harvest (current)			Harvest (at high goal)		
	Col basin	Ocean	Total	Col basin	Ocean	Total
Chinook	429,800	426,150	855,950	1,280,400	707,600	1,988,000
Spring	88,800	7,400	96,200	619,800	34,300	654,100
Summer	31,100	41,500	72,600	153,000	207,000	360,000
Fall	309,900	377,250	687,150	507,600	466,300	973,900
Chum	80	0	80	41,000	0	41,000
Coho	134,800	95,100	229,900	336,900	121,700	458,600
Sockeye	42,082	0	42,082	1,217,600	0	1,217,600
Steelhead	222,300	0	222,300	521,200	0	521,200
Winter	19,700	0	19,700	59,000	0	59,000
Summer	202,600	0	202,600	462,200	0	462,200
Totals	829,062	521,250	1,350,312	3,397,100	829,300	4,226,400

TABLE A-8. Current (2008-2017 average) and potential harvest of Columbia River salmon and steelhead in combined ocean and freshwater fisheries projected at high natural production goal, anticipated hatchery production and potential fishing levels.

Stock	Harvest (current)			Harvest (at high goal)		
	Col basin	Ocean	Total	Col basin	Ocean	Total
L Col R Spring Chinook	6,200	1,200	7,400	34,000	8,000	42,000
L Col R Fall (tule) Chinook	21,000	33,000	54,000	170,000	73,000	243,000
L Col R Late Fall (bright) Chinook	2,800	7,500	10,300	9,600	17,300	26,900
Select Area Fall (bright) Chinook	10,100	NA	10,100	10,100	NA	10,100
L Col R Coho	108,000	63,000	171,000	262,000	57,000	319,000
Col R Chum	80	0	80	41,000	0	41,000
SWW/LCR WA Winter Steelhead	19,500	0	19,500	31,000	0	31,000
L Col R Summer Steelhead	24,200	0	24,200	35,000	0	35,000
M Col R Spring Chinook	13,600	0	13,600	120,700	0	120,700
M Col Fall (tule) Chinook	52,000	34,000	86,000	52,000	34,000	86,000
M Col R Summer/Fall Chinook	5,600	10,300	15,900	15,400	18,600	34,000
M Col Fall (bright) Chinook	60,000	84,450	144,450	65,400	92,100	157,500
M Col R Coho	16,000	19,000	35,000	26,600	26,200	52,800
M Col Sockeye	100	0	100	71,700	0	71,700
M Col R Summer Steelhead	26,800	0	26,800	110,100	0	110,100
U Col R Spring Chinook	5,970	0	5,970	119,400	0	119,400
U Col R Summer Chinook	31,100	41,500	72,600	153,000	207,000	360,000
U Col R Fall Chinook	136,200	191,700	327,900	153,200	211,100	364,300
U Col R Coho	6,100	7,400	13,500	20,000	16,800	36,800
U Col R Sockeye	41,900	0	41,900	1,122,200	0	1,122,200
U Col R Summer Steelhead	9,700	0	9,700	126,000	0	126,000
Snake R Spring/Summer Chinook	44,230	0	44,230	235,000	0	228,000
Snake R Fall Chinook	22,200	16,300	38,500	31,900	20,200	52,100
Snake R Coho	4,700	5,700	10,400	28,300	21,700	50,000
Snake R Sockeye	82	0	82	23,700	0	23,700
Snake R Summer Steelhead	133,900	0	133,900	183,100	0	180,800
U Will R Spring Chinook	18,800	6,200	25,000	110,700	26,300	137,000
U Will R Winter Steelhead	200	0	200	28,000	0	28,000
U Will Summer Steelhead	8,000	0	8,000	8,000	0	8,000
Totals	829,062	521,250	1,350,312	3,397,800	829,300	4,226,400
Chinook	429,800	426,150	855,950	1,280,400	707,600	1,988,000
Spring	88,800	7,400	96,200	619,800	34,300	654,100
Summer	31,100	41,500	72,600	153,000	207,000	360,000
Fall	309,900	377,250	687,150	507,600	466,300	973,900
Chum	80	0	80	41,000	0	41,000
Coho	134,800	95,100	229,900	336,900	121,700	458,600
Sockeye	42,082	0	42,082	1,217,600	0	1,217,600
Steelhead	222,300	0	222,300	521,200	0	521,200
Winter	19,700	0	19,700	59,000	0	59,000
Summer	202,600	0	202,600	462,200	0	462,200
Lower Columbia River	191,880	104,700	296,580	592,700	155,300	748,000
Mid Columbia River	174,100	147,750	321,850	461,900	170,900	632,800
Upper Columbia River	230,970	240,600	471,570	1,693,800	434,900	2,128,700
Snake River	205,112	22,000	227,112	502,000	41,900	543,900
Willamette	27,000	6,200	33,200	146,700	26,300	173,000

Phase 2 Report, pg. 183. Table A-8.

Current (2008-2017 average) and potential harvest of Columbia River salmon and steelhead in combined ocean and freshwater fisheries projected at high natural production goal, anticipated hatchery production and potential fishing levels.

Phase 2 Report, pg. 55 Table 11.

Columbia River mouth run sizes for salmon and steelhead at low and high natural production goals in conjunction with anticipated hatchery production and potential harvest relative to current numbers.

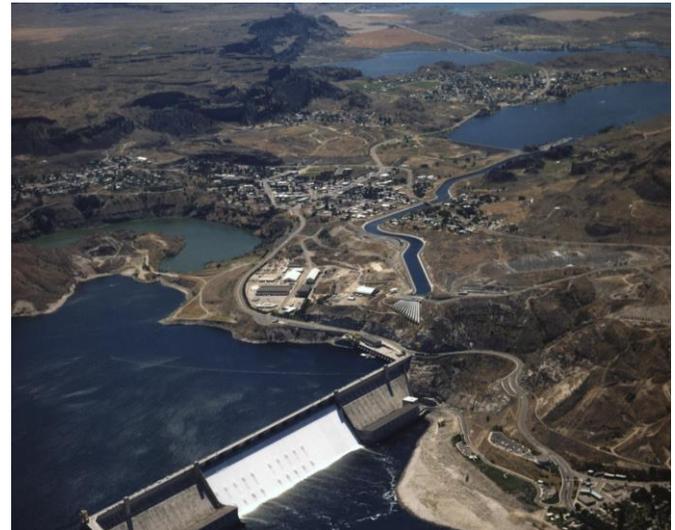
TABLE 11. Columbia River mouth run sizes for salmon and steelhead at low and high natural production goals in conjunction with anticipated hatchery production and potential harvest relative to current numbers.

	Species	Natural origin	Hatchery origin	Total	% Hatchery
Current Run Size	Chinook	384,740	718,400	1,103,140	65%
	Spring	58,940	217,100	276,040	79%
	Summer	30,000	45,000	75,000	60%
	Fall	295,800	456,300	752,100	61%
	Chum	14,700	300	15,000	2%
	Coho	34,000	375,100	409,100	92%
	Sockeye	297,490	34,070	331,560	10%
	Steelhead	107,600	375,700	483,300	78%
	Winter	17,300	33,000	50,300	66%
	Summer	90,300	342,700	433,000	79%
Total	838,530	1,503,570	2,342,100	64%	
Run Size at Low Goals	Chinook	536,700	727,700	1,264,400	58%
	Spring	198,400	217,300	415,700	52%
	Summer	30,000	43,000	73,000	59%
	Fall	308,300	467,400	775,500	60%
	Chum	21,000	0	21,000	0%
	Coho	116,300	375,100	491,400	76%
	Sockeye	320,100	53,600	373,700	14%
	Steelhead	187,900	371,400	559,300	66%
Winter	57,000	28,000	85,000	33%	
Summer	130,900	343,400	474,300	72%	
Total	1,182,000	1,527,800	2,709,800	56%	
Run Size at High Goals	Chinook	1,753,300	1,046,300	2,799,600	37%
	Spring	1,042,500	342,000	1,384,500	25%
	Summer	234,000	140,000	374,000	37%
	Fall	476,800	564,300	1,041,100	54%
	Chum	102,000	0	102,000	0%
	Coho	446,400	375,100	821,500	46%
	Sockeye	2,913,900	100,000	3,013,900	3%
	Steelhead	886,300	394,300	1,280,600	31%
Winter	163,000	28,000	191,000	15%	
Summer	723,300	366,300	1,089,600	34%	
Total	6,101,900	1,915,700	8,017,600	24%	



Break

10 minutes

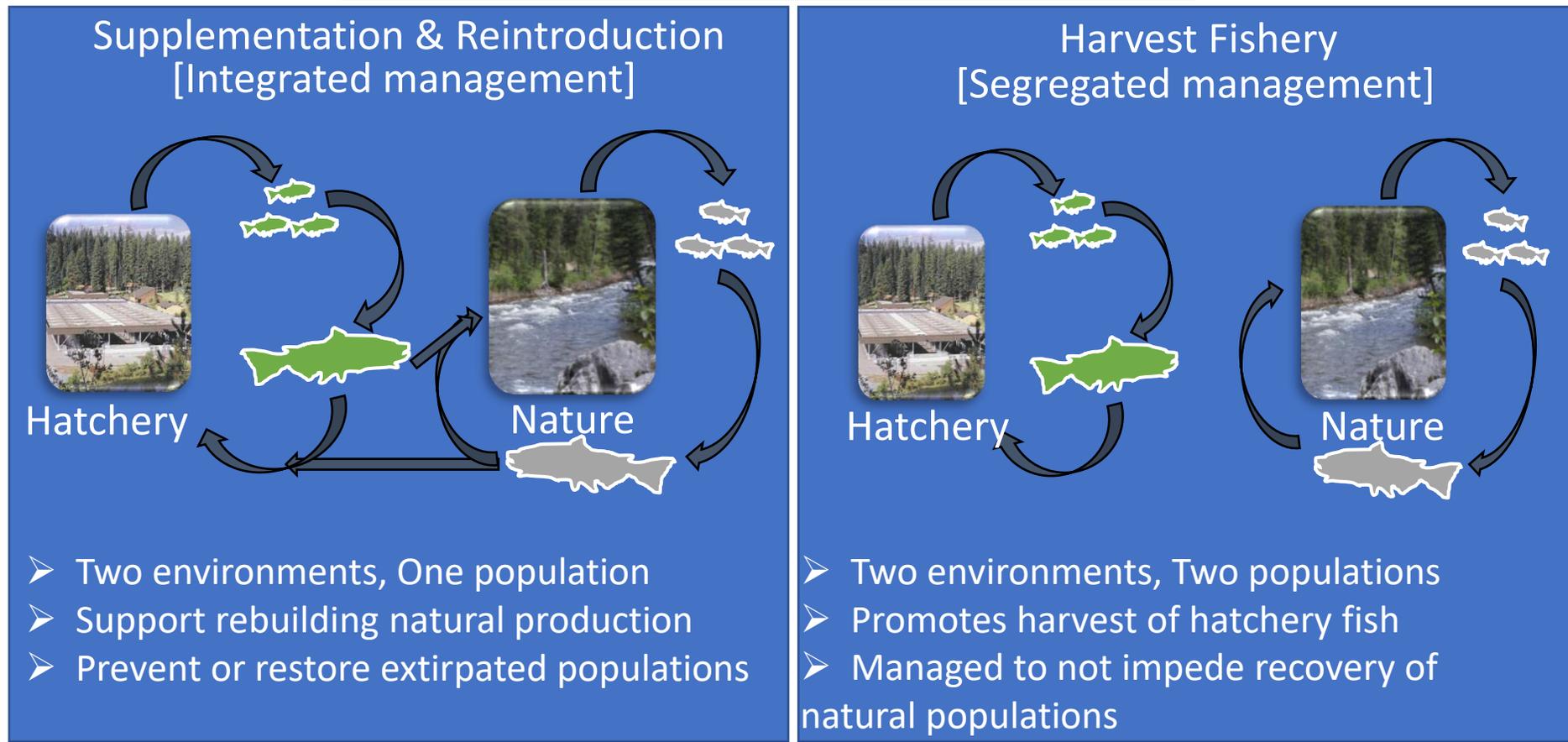


Hatchery Management

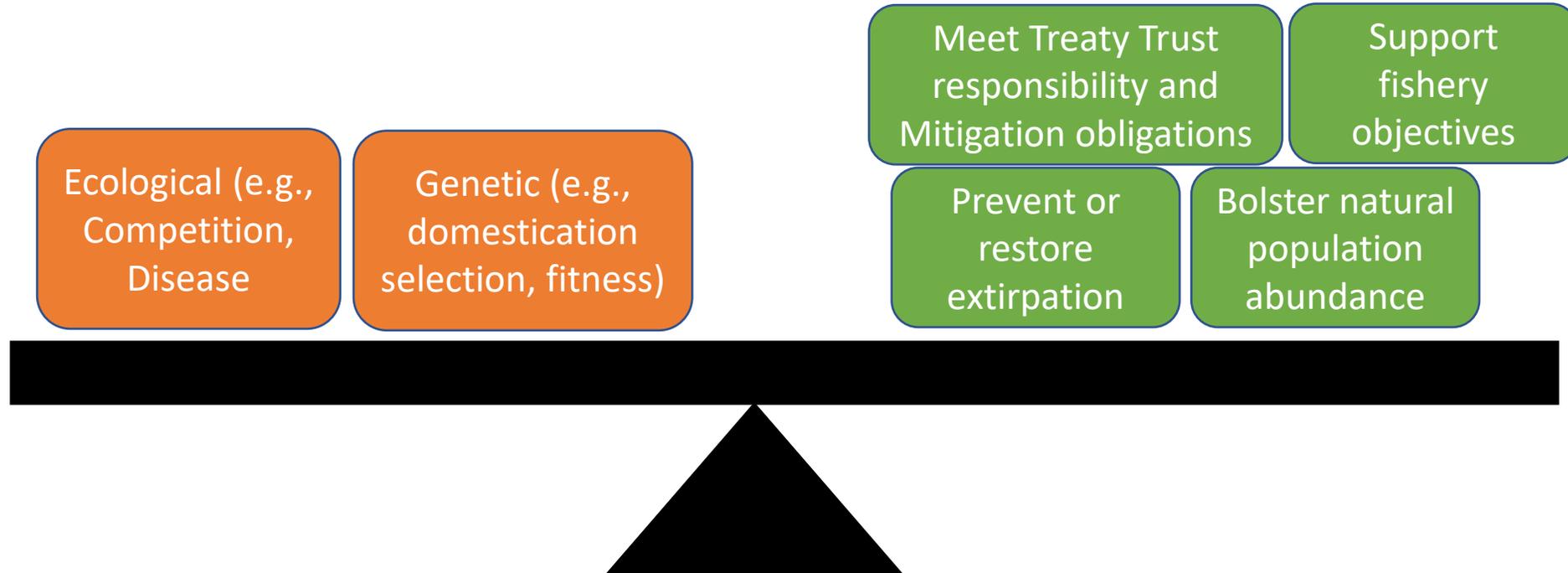
Management purpose of hatchery programs

- 1.) Harvest Fishery – Fish for harvest
- 2.) Supplementation – Prevent extirpation, rebuild natural production
- 3.) Reintroduction – Restore extirpated populations

Two different management approaches



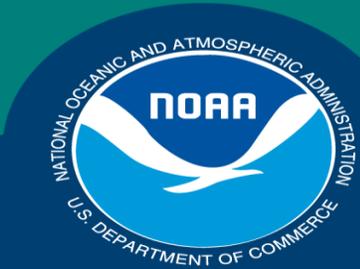
Balancing and managing risk while meeting mitigation and conservation objectives



Hatchery operations are managed to minimize risks

- Broodstock management (e.g., local, factorial mating, integrated, segregated)
- Rearing strategies (e.g., densities, feeding, disease management)
- Release strategies (e.g., timing, location, acclimation, life stage, marking)
- Adult returns (e.g., pHOS, PNI, fisheries)
- Monitoring, assessment, reporting, and adaptive management

Science, Service, Stewardship



Reviewing HGMPs Under the Endangered Species Act

November 1, 2022

Natasha Preston
Hatcheries and Inland Fisheries

**NOAA
FISHERIES
SERVICE**

NOAA



HGMP Review Process

- HGMP jointly submitted to NOAA from co-managers
- Pre-consultation coordination
- ESA biological opinion for effects on species under NOAA's jurisdiction
- ESA biological opinion for effects on species under USFWS jurisdiction
- NEPA (EA or EIS)
- ESA decision documents



What happens in the pre-consultation process?

- HGMP jointly submitted to NOAA from co-managers
- NOAA reviews the HGMP
- NOAA asks clarifying questions and requests additional information as needed

**HATCHERY AND GENETIC MANAGEMENT PLAN
(HGMP)**

Hatchery Program:

Species or Hatchery Stock:

Agency/Operator:

Watershed and Region:

Date Submitted:

Date Last Updated:



Evaluating HGMPs under NEPA

- NEPA completed by NOAA when we fund HGMPs (Mitchell Act) or authorize HGMPs under the ESA (section 10 permits or 4(d) authorizations).
- NOAA completes an Environmental Impact Statement (EIS) or Environmental Assessment (EA) depending on the significance of impacts (biological, social, economical)



Analysis of Hatchery Effects

Programs evaluated for their effects on listed species in terms of four viability parameters (McElhany et al 2000):

- Abundance
- Productivity
- Diversity
- Spatial structure

Programs evaluated for their effects at three levels:

- Population
- Major population group
- ESU/DPS

Populations differ as to role in recovery of listed species



Analysis of Hatchery Effects

Analysis of programs is carried out in six categories:

- Demographic effects
- Genetic effects
- Ecological effects
- Facility effects
- Research, monitoring, and evaluation effects
- Harvest effects



Evaluating HGMPs under the ESA

Based on analysis, conclusion is reached as to whether program(s) pose jeopardy (risk to survival or recovery) to listed species (ESUs/DPSs)



Measuring Take

Take must be measured by program operators as stipulated in Biological Opinion and reported to NMFS on regular basis, typically annually.



Consultation with USFWS

Before NOAA can complete final ESA and NEPA documents, we also must consult with the USFWS if the HGMP will impact ESA-listed species under their jurisdiction (e.g., bull trout and marbled murrelets).



Additional Public Comment Opportunities

- In addition to the NEPA public comment period(s), NOAA publishes our ESA pending determination document for a **30-day public review period** when considering an HGMP under Limit 6 of the ESA 4(d) Rule.

- Before issuing a Section 10 permit or authorizing an HGMP under Limit 5 of the ESA 4(d) Rule, NOAA will publish the HGMP for a **30-day public comment period**.



Final ESA Determination

After we consider public comment, complete our NEPA analysis, the NOAA ESA consultation, the USFWS ESA consultation, we make a final agency decision on the HGMP.

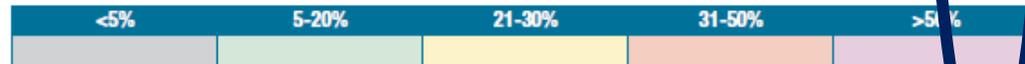


Columbia Basin Hatchery Science Reviews

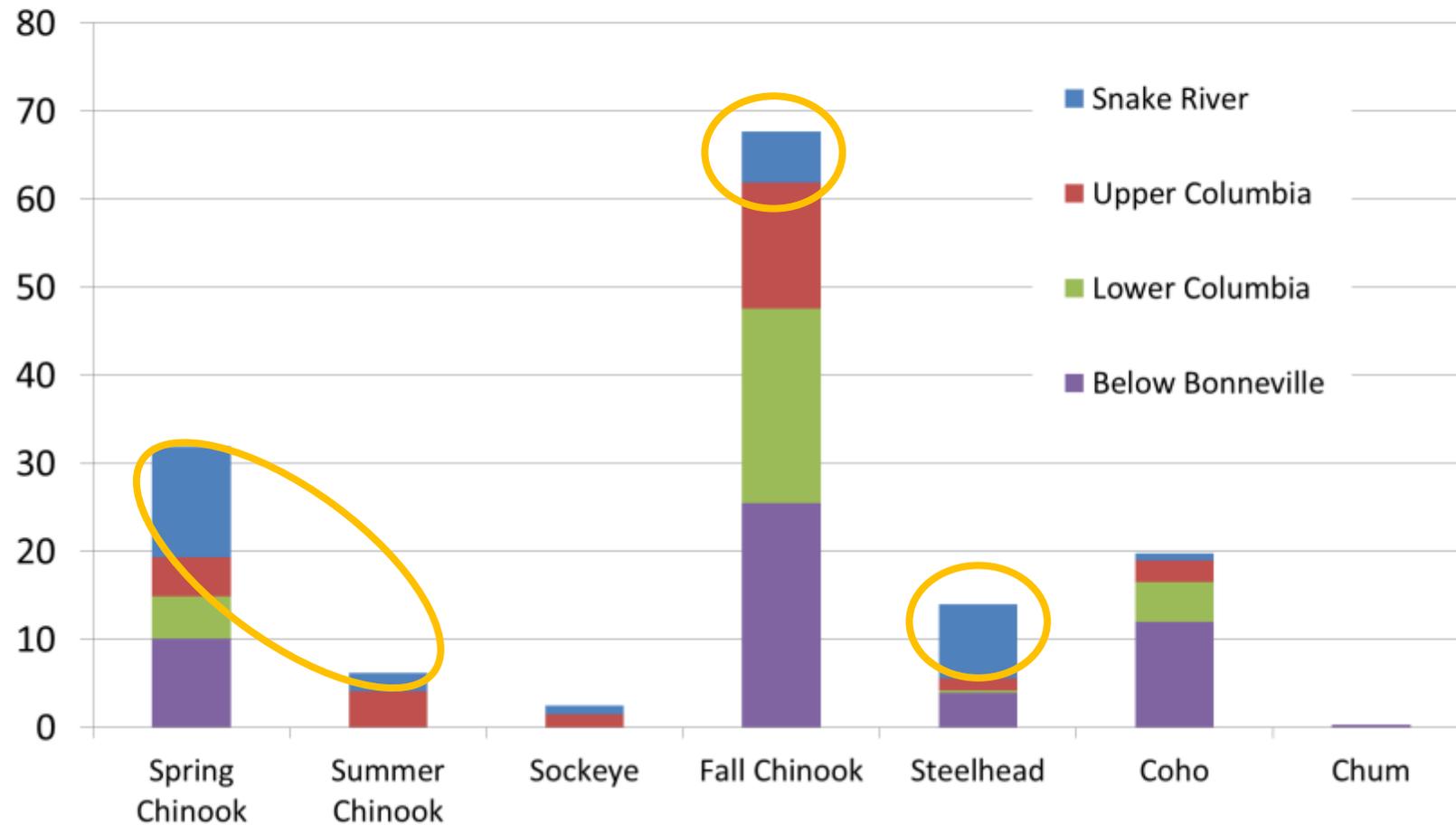
- IHOT – Integrated Hatchery Operation Review Team
- APR – Artificial Production Review & APRE (Evaluation)
- HSRG – Hatchery Scientific Review Group
- HRT – Hatchery Review Team
- NATURES Review Team (Yakima Klickitat Fisheries Project & Nez Perce Tribal Hatchery)
- Northwest Power and Conservation Council (NPCC) Categorical Review
- NPCC Three Step Review process
- HGMP – and ESA consultation

FIGURE 13. Heat map of impacts of limiting factors by stock and region, including ranges reflecting uncertainties where appropriate. Units are percentage reductions in equilibrium abundance (generally equivalent to mortality rates).

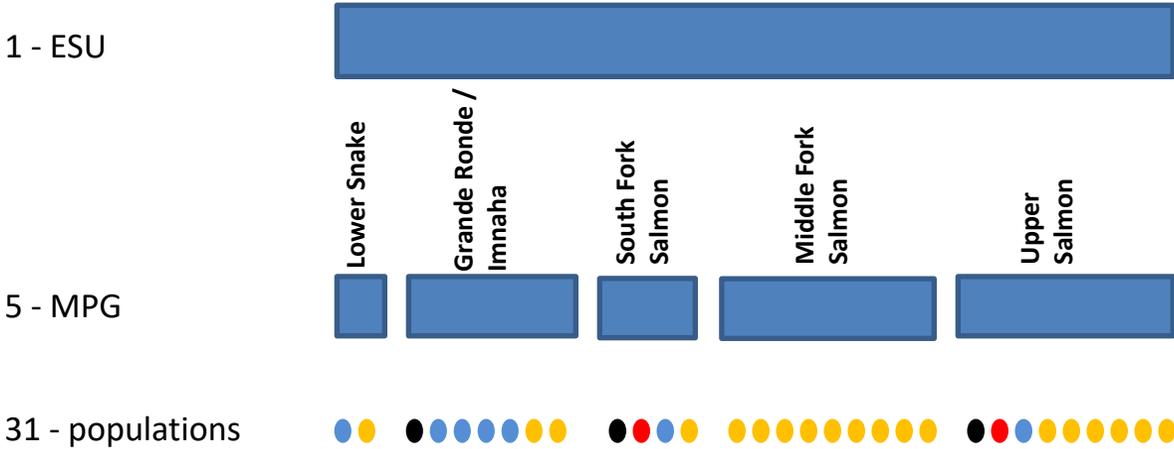
	Stock	Tributary Habitat	Estuary Habitat	Hydro (mainstem)	Hydro (latent)	Hydro (blocked)	Predation	Fishery	Harvest
Lower Columbia	Spr Chinook	85	17	0	0 (0-0)	30	14	17	29 (4-54)
	Fall (tule) Chinook	70	21	0	0 (0-0)	15	11	33	25 (3-47)
	Fall (bright) Chinook	10	21	0	0 (0-0)	40	11	47	0 (0-0)
	Chum	95	50	5	0 (0-0)	0	2	1	10 (1-18)
	Coho	80	11	0	0 (0-0)	5	13	17	22 (3-42)
	Sumr Steelhead	65	28	4	0 (0-0)	40	19	5	8 (1-15)
	Win Steelhead SWW	60	28	0	0 (0-0)	0	19	5	17 (2-33)
	Win Steelhead LCR	65	28	0	0 (0-0)	10	19	5	9 (1-16)
Willamette	Spr Chinook	85	20	0	0 (0-0)	50	19	13	25 (3-46)
	Win Steelhead	80	28	0	0 (0-0)	20	32	3	2 (0-4)
Middle Columbia	Spr Chinook	85	17	23	14 (3-25)	25	25	15	24 (3-45)
	Fall Chinook	20	27	13	9 (2-17)	5	10	55	0 (0-0)
	Coho	NA	11	30	19 (5-33)	0	17	22	NA
	Sockeye	0	17	19	9 (2-17)	95	8	3	NA
	Sumr Steelhead	80	28	11	14 (3-25)	20	33	10	17 (2-33)
Upper Columbia	Spr Chinook	45	18	49	38 (9-67)	75	29	15	32 (5-59)
	Summer Chinook	50	27	49	38 (9-67)	50	13	61	27 (4-51)
	Fall Chinook	25	27	65	19 (5-33)	5	13	61	10 (1-18)
	Sockeye	50	17	38	38 (9-67)	80	24	12	10 (1-18)
	Sumr Steelhead	40	31	30	38 (9-67)	95	52	10	24 (3-45)
Snake	Spr Chinook	50	16	39	38 (9-67)	30	29	14	15 (2-28)
	Fall Chinook	25	27	62	38 (9-67)	80	13	45	NA
	Sockeye	10	17	47	38 (9-67)	70	24	6	NA
	Sumr Steelhead	45	27	30	38 (9-67)	40	43	25	24 (3-45)



Columbia Basin salmon and steelhead production (in millions) by release area



Snake River Spring/Summer Chinook Salmon



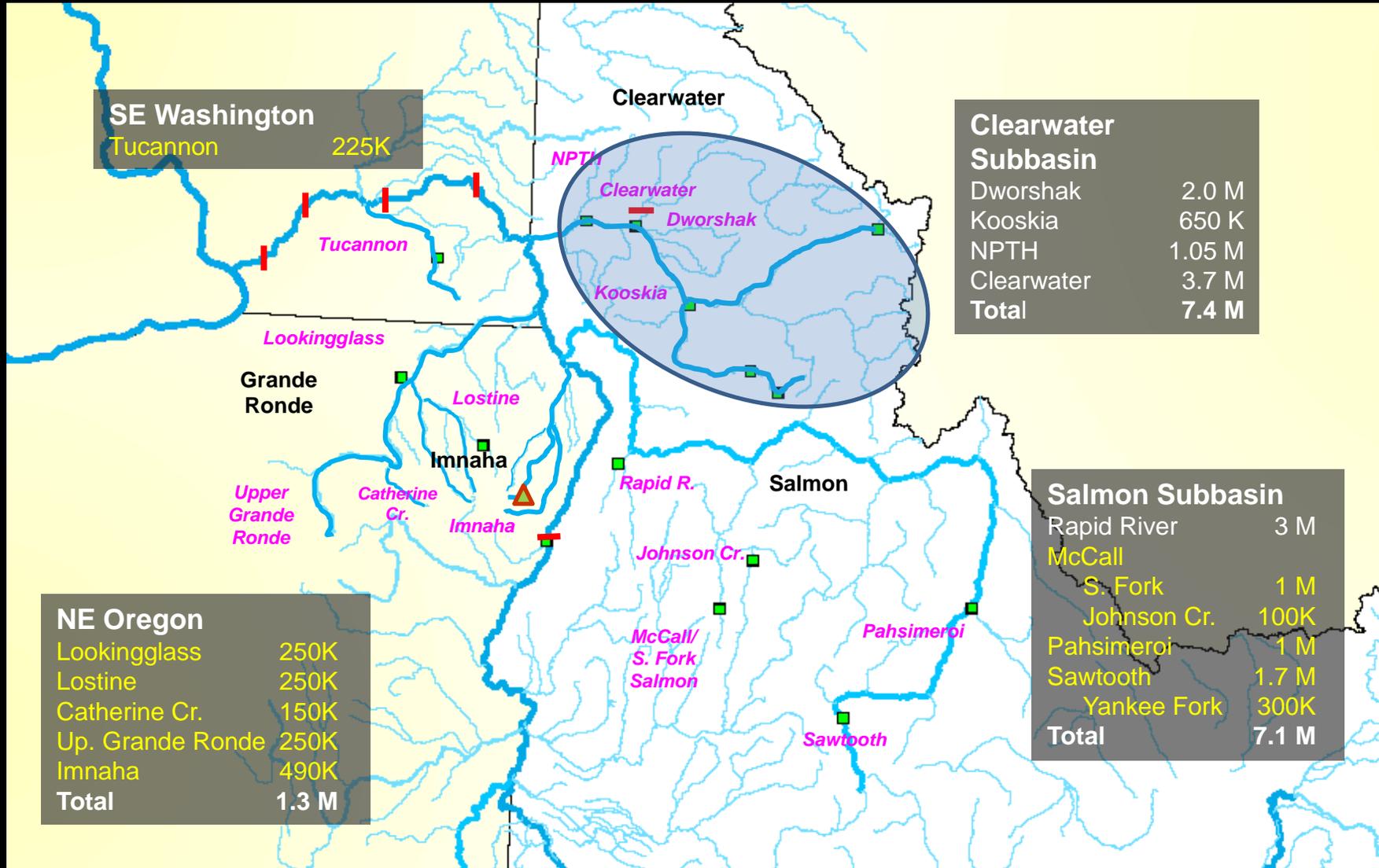
- = LSRCP and FWP
- = LSRCP
- = IPC
- = No Hatchery

■ 39% with hatchery program



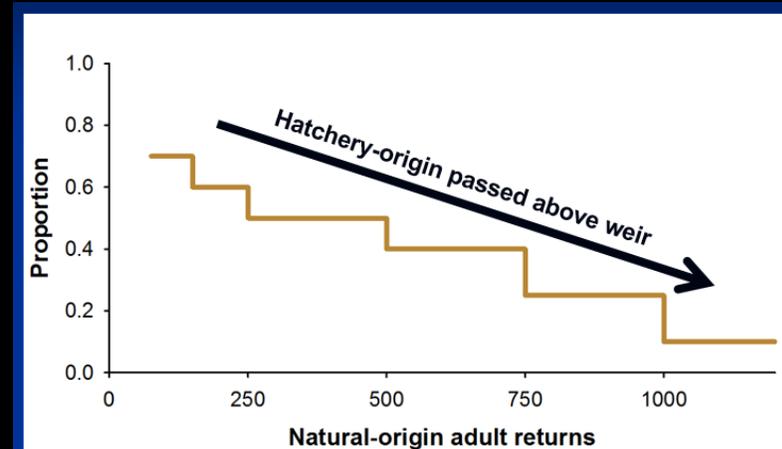
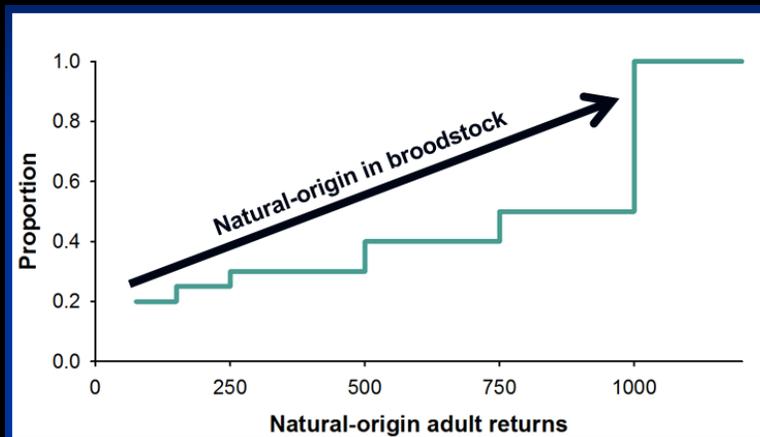
Snake River Basin Hatchery Sp/Su Chinook Salmon ~ 16 M

5.6 M ESA listed (integrated) & 10.4 M unlisted (segregated)



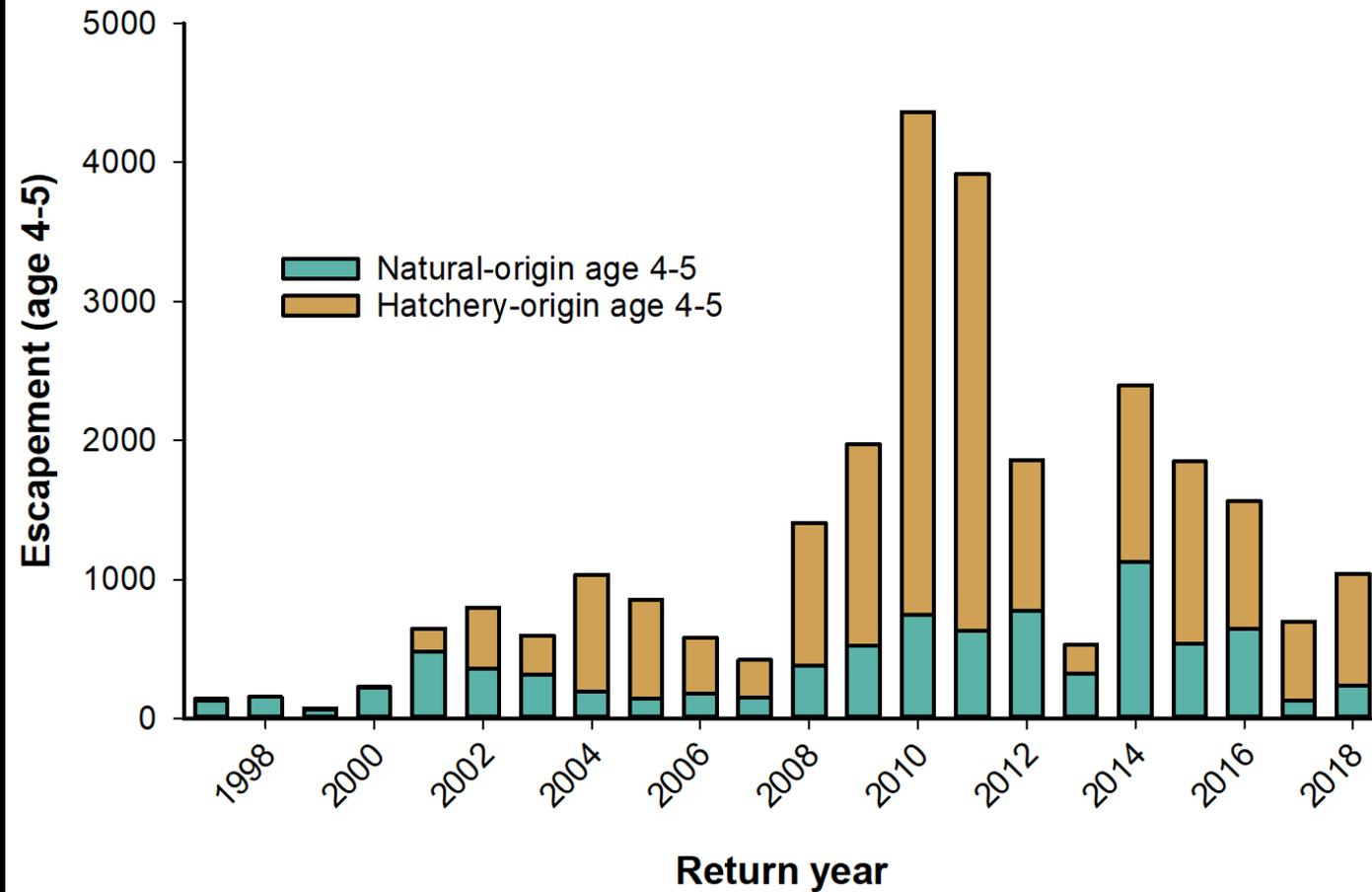
Integrated (Supplementation/Conservation)

- Native/Local Broodstock – Hatchery x Natural
- Adult weir in target return stream
- Sliding scale management tool - incorporate natural fish in broodstock and proportion of hatchery fish spawning naturally
- Acclimation of juveniles in target stream
- Marking – PIT tags survival, CWT for harvest contribution, fin clip for management, PBT mark for evaluation
- Robust M&E program – evaluate performance of hatchery fish, natural production and potential hatchery impacts





Lostine River spring Chinook



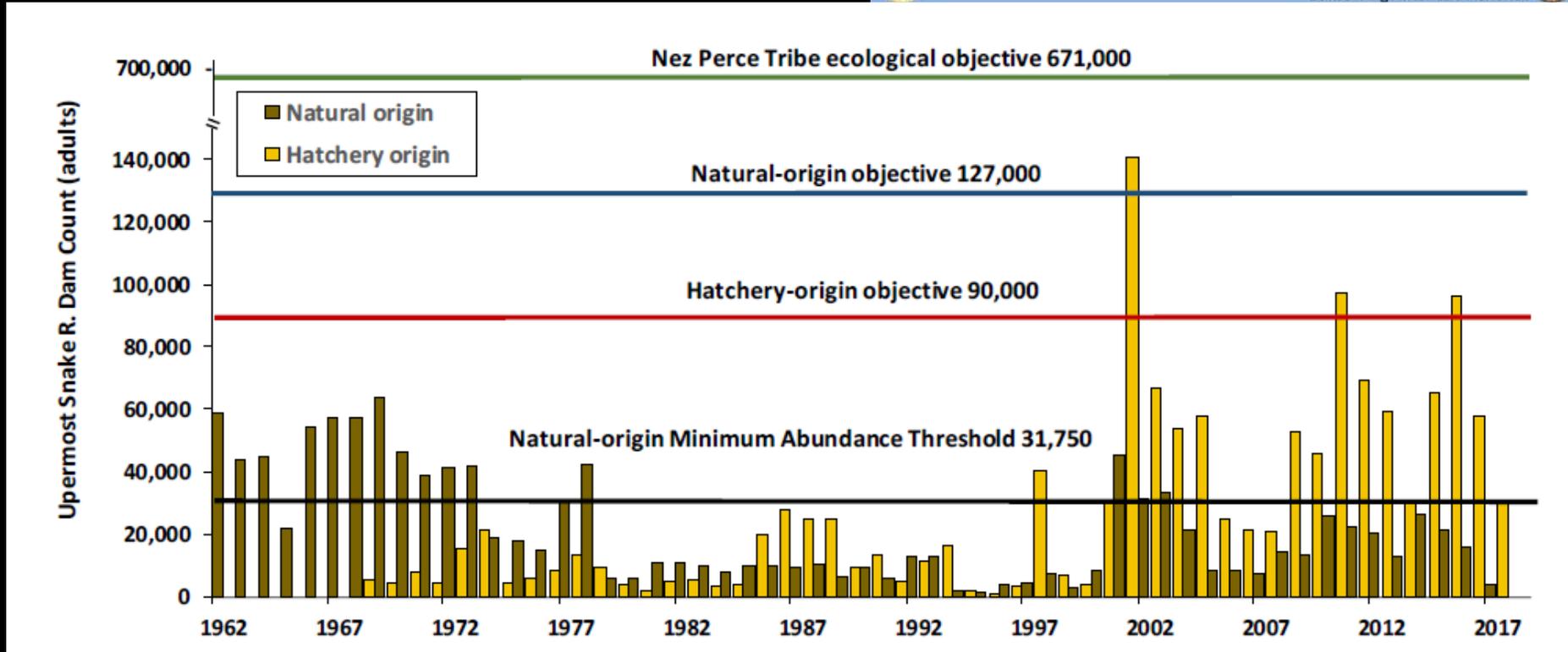
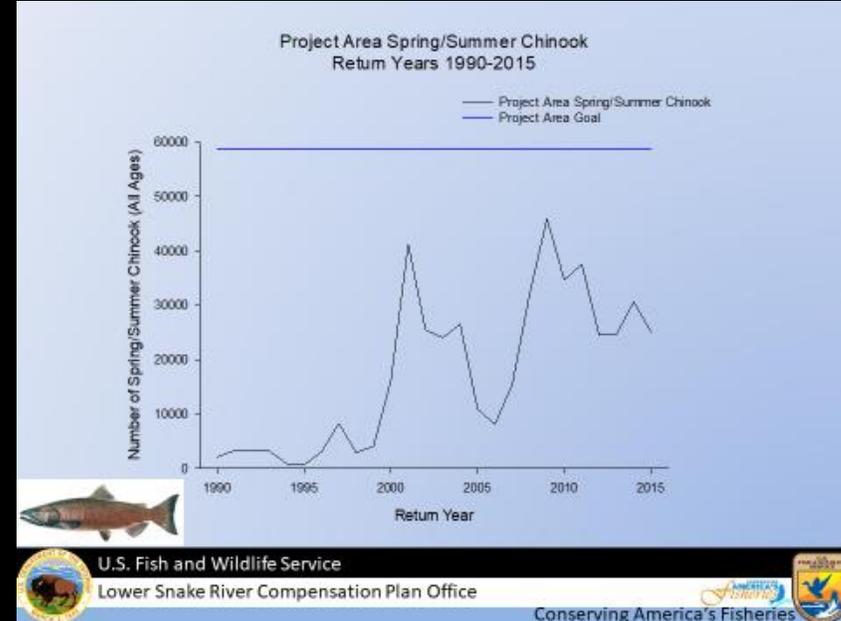
Segregated (Harvest/Fishery)

- Local or non-local Broodstock – Hatchery x Hatchery
- Juvenile releases typically from main hatchery – not in primary spawning/rearing habitat of wild populations
- Adult weir/trap at main hatchery
- Marking – PIT tags survival, CWT for harvest contribution, fin clip for management, PBT mark for evaluation
- M&E program to evaluate performance and contribution to fisheries, return to hatchery, less than 5% in natural populations

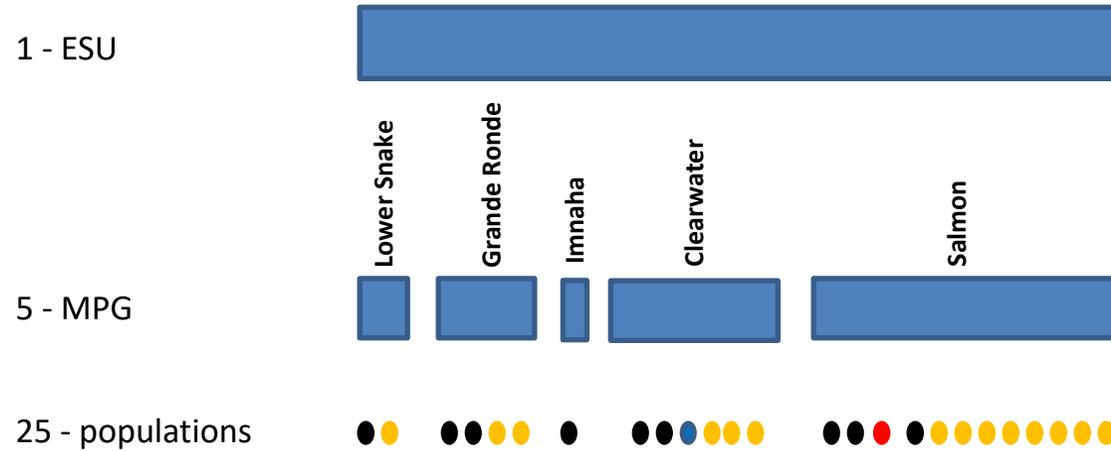


Snake River spring/summer Chinook

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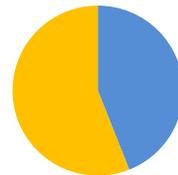


Snake River Steelhead

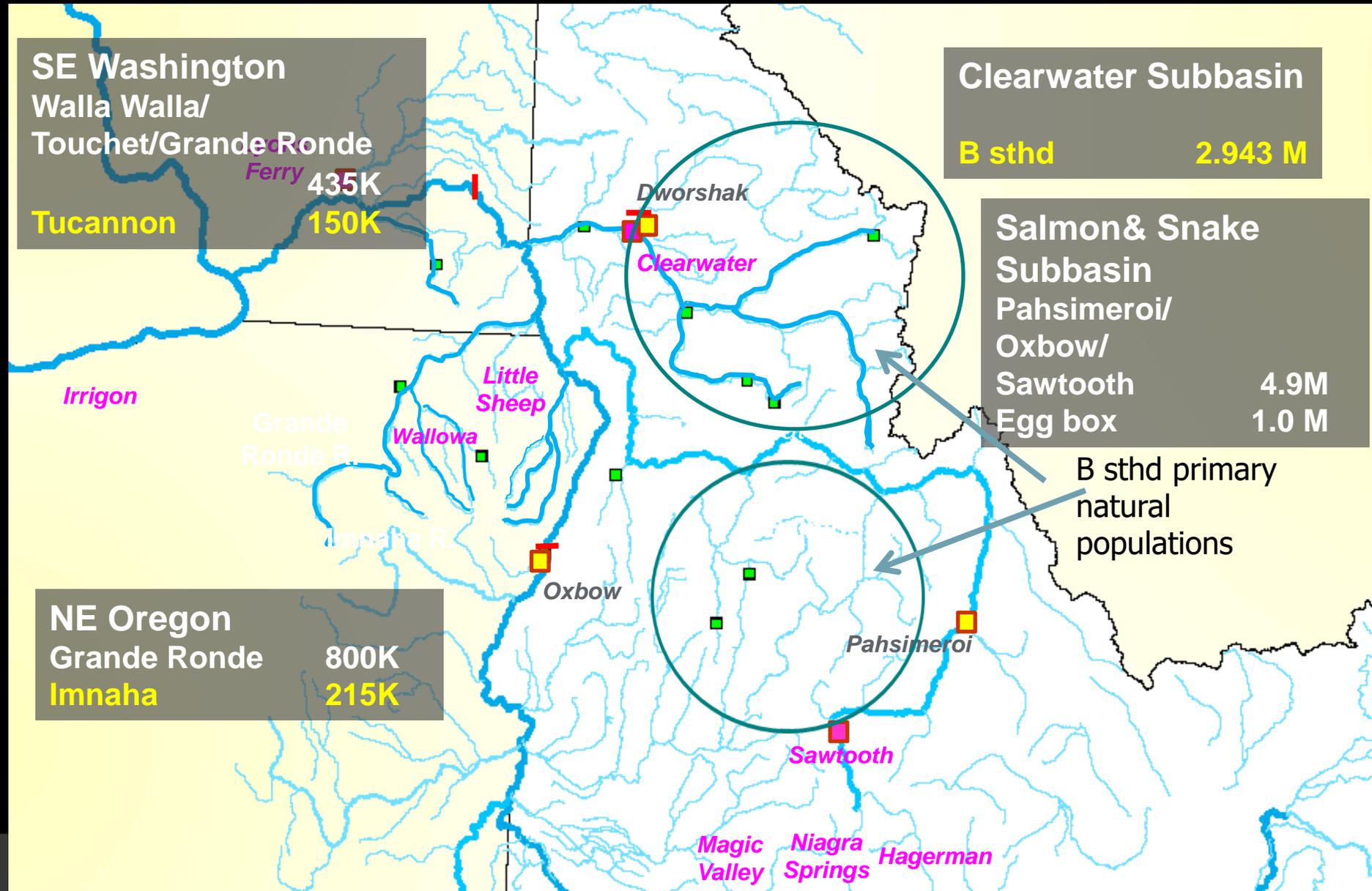


- = Dworshak mitigation
- = LSRCP
- = IPC
- = No Hatchery

■ 44% with hatchery program

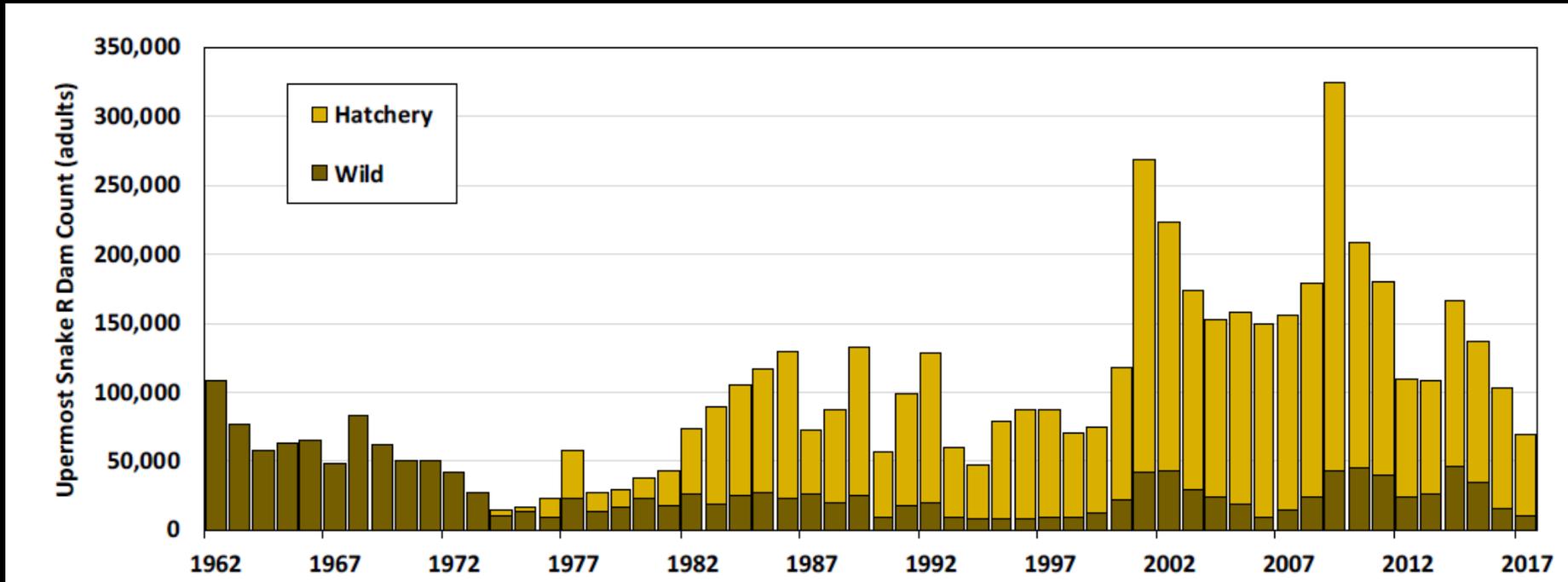
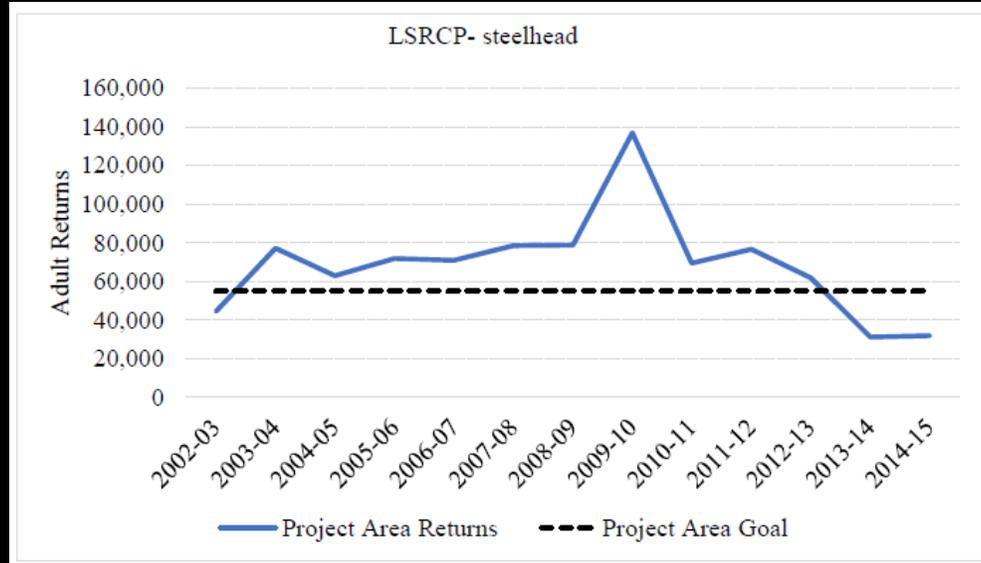


Snake River Hatchery Steelhead ~9.5 M
3.5 M ESA listed (integrated & segregated) &
6.0 unlisted (segregated)



Snake River steelhead

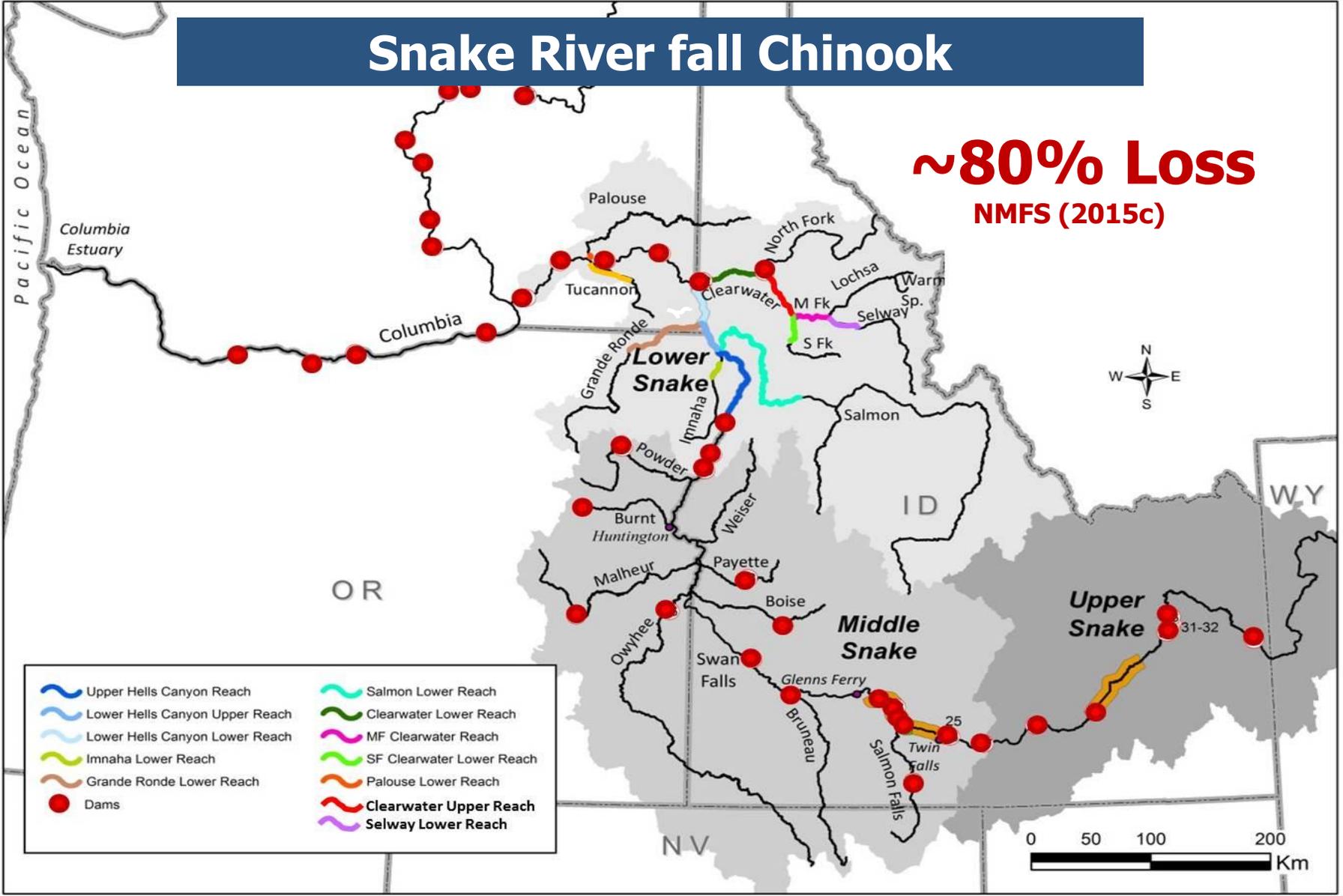
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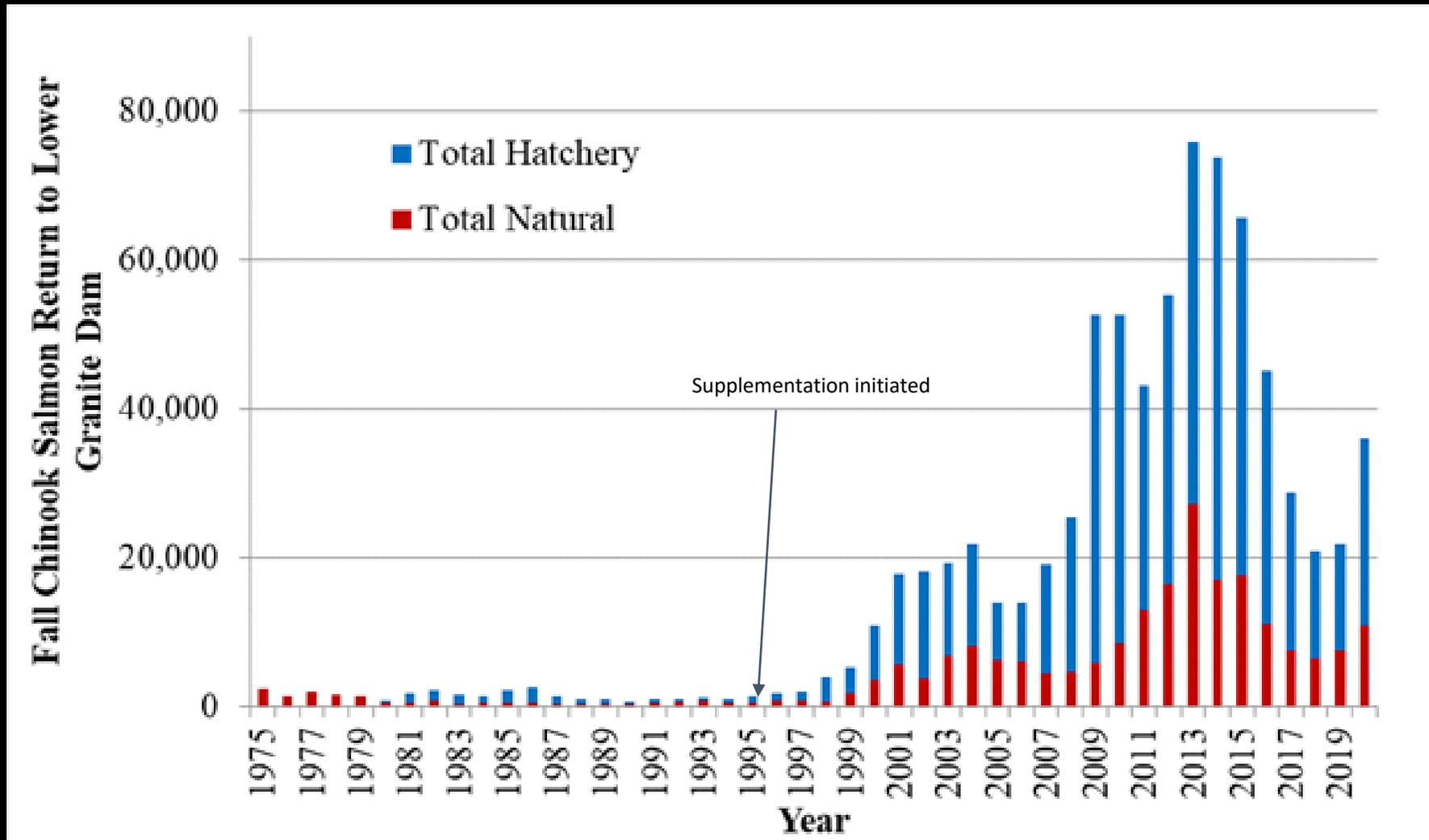
Contemporary Distribution

Snake River fall Chinook

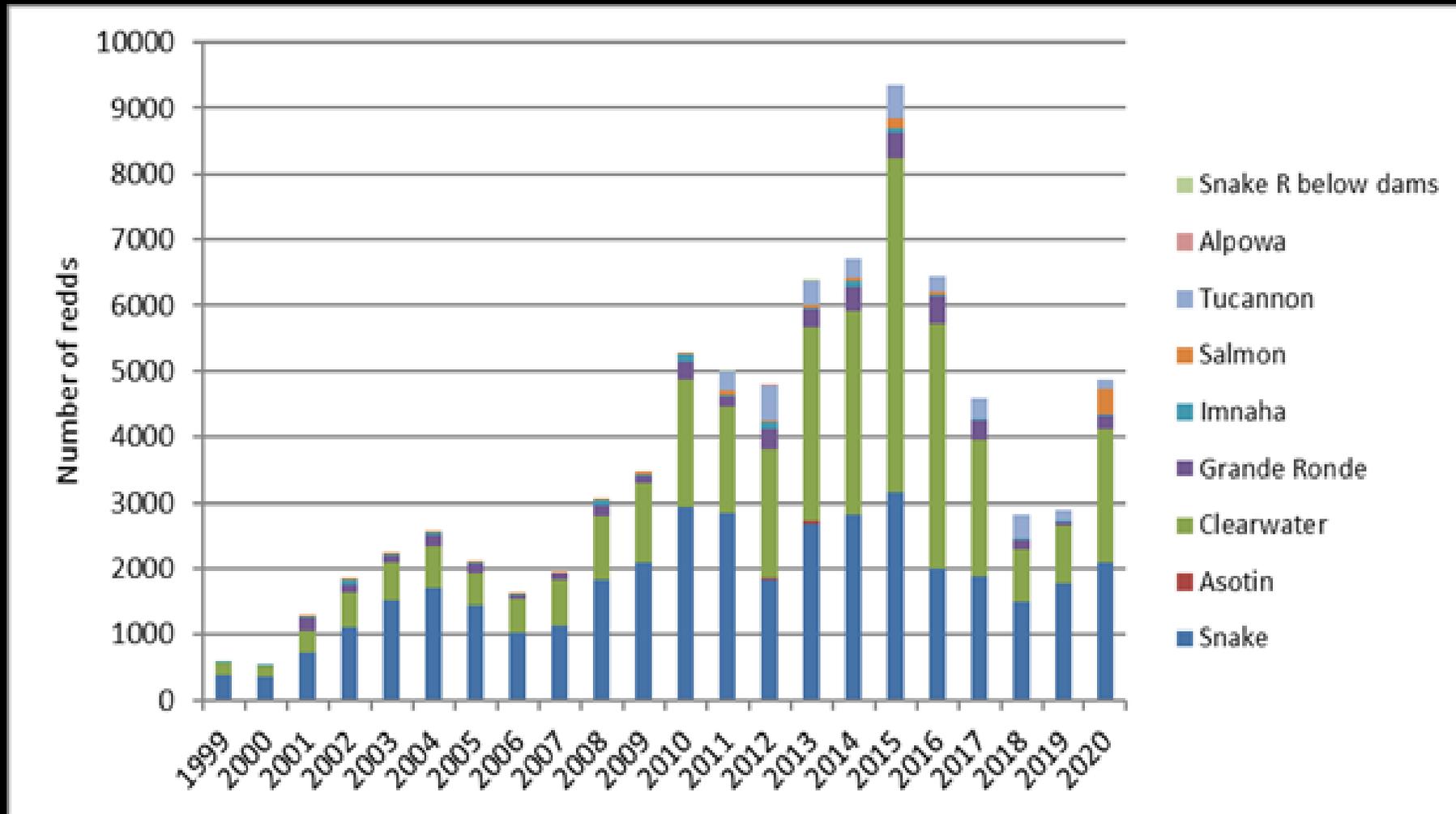
~80% Loss
NMFS (2015c)



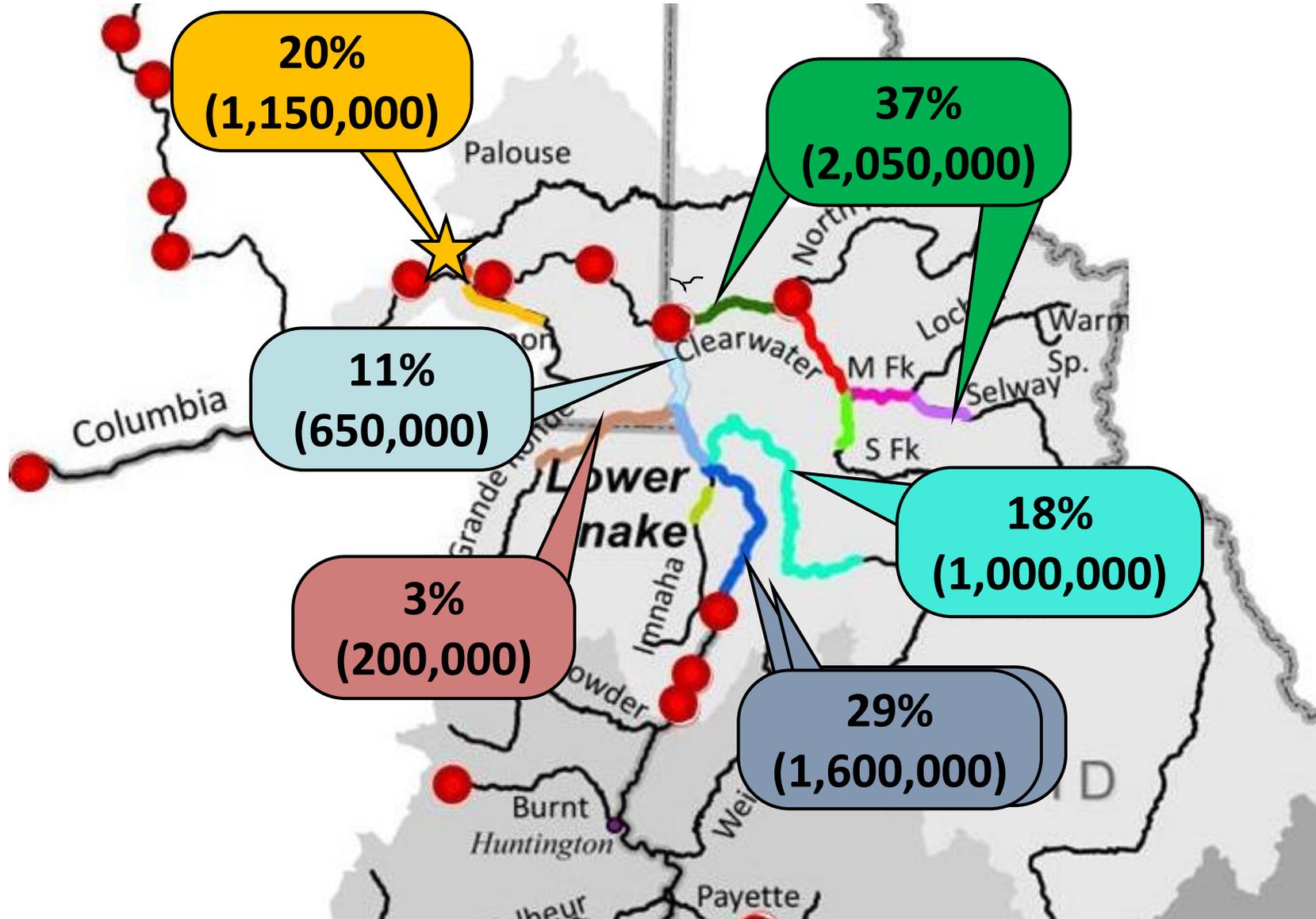
Snake River fall Chinook - counts at Lower Granite Dam 1975-2020.
Ten year geometric mean is 10,044 natural origin fish.



Snake River fall Chinook redds – natural spawning

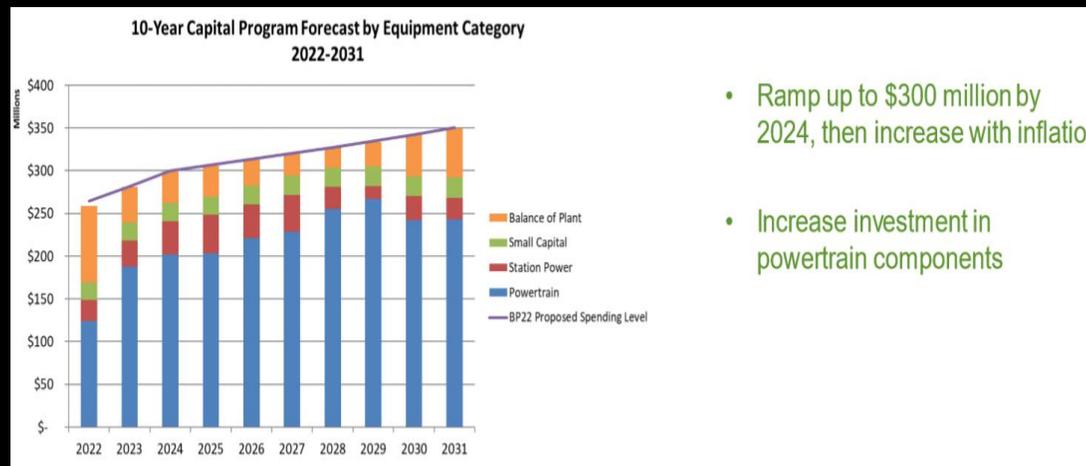


Modified Hatchery Release Distribution – Natural Production Emphasis Area



Summary of Columbia Basin Federal Hatcheries Infrastructure Needs Deferred Maintenance & Capital Fixes

Northwest Power Act - Bonneville Power Administration Fish & Wildlife Program	\$ 11.7 M
Grand Coulee Mitigation - Bureau of Reclamation	
Lower Snake River Compensation Plan - U.S. Fish & Wildlife Service/BPA	\$ 61.4 M
	\$131 M
Columbia River Development Mitigation - U.S. Fish & Wildlife Service	\$32.5 M
Mitchell Act (Columbia River Development) - NOAA Fisheries	\$232 M
John Day Mitigation - U.S. Army Corps of Engineers	\$25-175M
Dworshak Dam Mitigation - U.S. Army Corps of Engineers	\$47.8 M
Willamette Basin Mitigation - U.S. Army Corps of Engineers	<u>\$159 M</u>
	\$850.4 M



Gaps and Needs

Next Steps and Action Items

Thank you ~



Photo credit: Roger Tabor